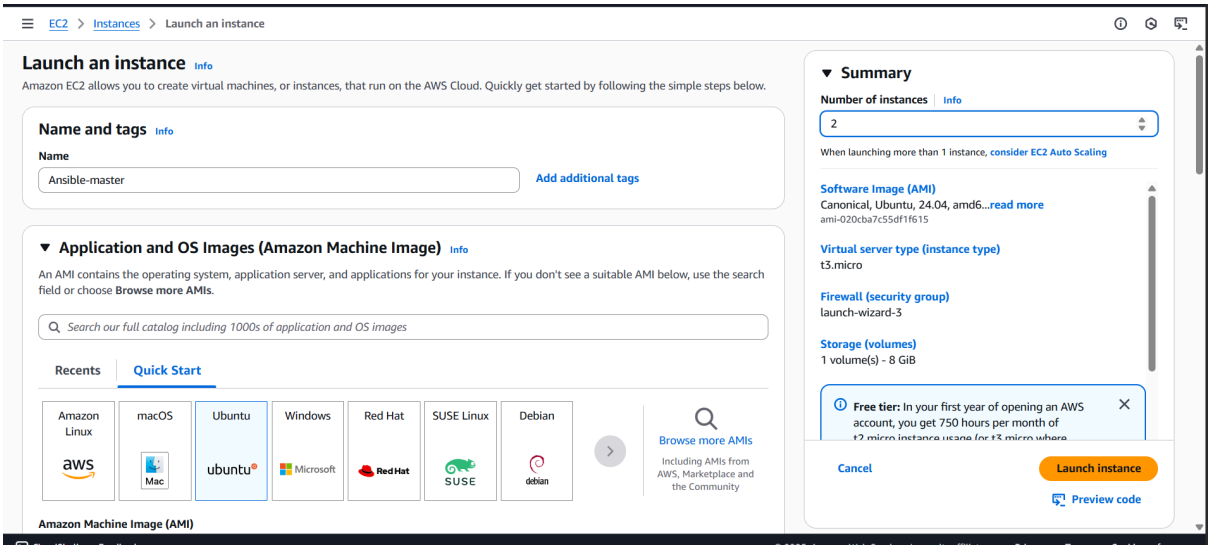
# Assessment 2

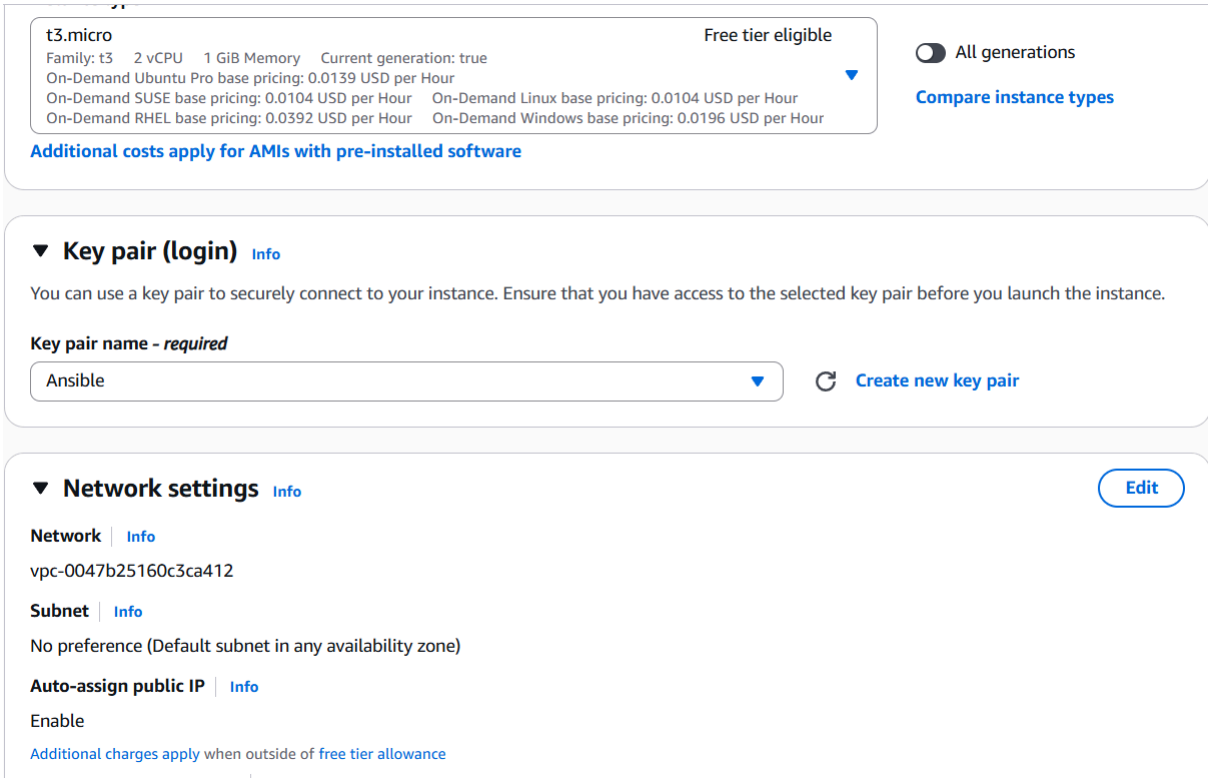
## Question 1- Ansible installation and linking nodes to master

### Step 1. Creating a EC2 machine:

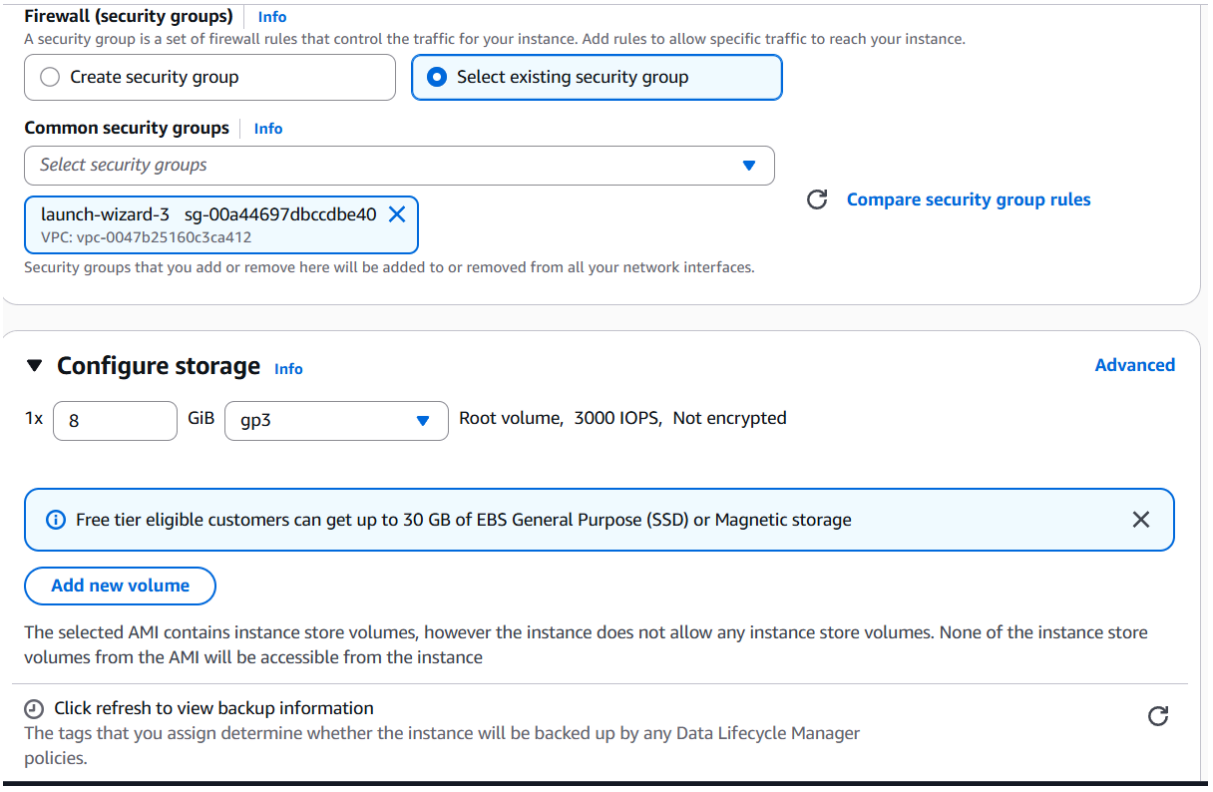
a) Writing the instance name, selecting AMI and number of instances to launch (here we are launching 2 one will be master and other as node)




b) Selecting instance type as t3 micro and key pair for it




c) Selecting Security group ( I have used pre created SG that has ssh, http and https access)




## Step 2: Installing Ansible and setting up both node and master

a) Master - Running updates and ansible installation in root

```
Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status


The list of available updates is more than a week old.
To check for new updates run: sudo apt update


The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-34-156:~$ sudo su
root@ip-172-31-34-156:/home/ubuntu# apt update -y
 apt-get install -y software-properties-common
 apt-add-repository ppa:ansible/ansible
  apt-get update
  apt-get install -y ansible
```

**i-0d40b6e056e27dac2 (Ansible-master)**

PublicIPs: 13.223.179.221 PrivateIPs: 172.31.34.156

b) Node - Entering root and doing updates in node as well

```
  Usage of /:   25.4% of 6.71GB   Processes:             114
  Memory usage: 24%               Users logged in:       0
  Swap usage:   0%                IPv4 address for ens5: 172.31.39.232

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status


The list of available updates is more than a week old.
To check for new updates run: sudo apt update


The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-39-232:~$ sudo su
root@ip-172-31-39-232:/home/ubuntu# apt update -y
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
```

**i-03f464371ff4c5926 (Ansible-node)**

PublicIPs: 34.207.241.222 PrivateIPs: 172.31.39.232

c)Master - Checking ansible version in master and making changes in host file

```
root@ip-172-31-34-156:/home/ubuntu# ansible --version
ansible [core 2.18.8]
  config file = /etc/ansible/ansible.cfg
  configured module search path = ['/root/.ansible/plugins/modules', '/usr/share/ansible/plugins/modules']
  ansible python module location = /usr/lib/python3/dist-packages/ansible
  ansible collection location = /root/.ansible/collections:/usr/share/ansible/collections
  executable location = /usr/bin/ansible
  python version = 3.12.3 (main, Feb  4 2025, 14:48:35) [GCC 13.3.0] (/usr/bin/python3)
  jinja version = 3.1.2
  libyaml = True
root@ip-172-31-34-156:/home/ubuntu# vi /etc/ansible/hosts
```

**i-0d40b6e056e27dac2 (Ansible-master)**

d) Master - Adding private ip of node in master

```
# This is the default ansible 'hosts' file.
#
# It should live in /etc/ansible/hosts
#
#   - Comments begin with the '#' character
#   - Blank lines are ignored
#   - Groups of hosts are delimited by [header] elements
#   - You can enter hostnames or ip addresses
#   - A hostname/ip can be a member of multiple groups

# Ex 1: Ungrouped hosts, specify before any group headers:
[ansiblegroup]
172.31.39.232
## green.example.com
## blue.example.com
## 192.168.100.1
## 192.168.100.10

# Ex 2: A collection of hosts belonging to the 'webservers' group:

## [webservers]
## alpha.example.org
## beta.example.org
## 192.168.1.100
## 192.168.1.110

# If you have multiple hosts following a pattern, you can specify
# them like this:
-- INSERT --
```

**i-0d40b6e056e27dac2 (Ansible-master)**

PublicIPs: 13.223.179.221  PrivateIPs: 172.31.34.156

e)Master - Adding another user Devops

```
root@ip-172-31-34-156:/home/ubuntu# adduser devops
```

```
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for devops
Enter the new value, or press ENTER for the default
        Full Name []:
        Room Number []:
        Work Phone []:
        Home Phone []:
        Other []:
Is the information correct? [Y/n] y
info: Adding new user `devops' to supplemental / extra groups `users' ...
info: Adding user `devops' to group `users' ...
root@ip-172-31-34-156:/home/ubuntu#
```

**i-0d40b6e056e27dac2 (Ansible-master)**

PublicIPs: 13.223.179.221 PrivateIPs: 172.31.34.156

f) Node – Adding another user Devops with same credentials as in master

```
root@ip-172-31-39-232:/home/ubuntu# adduser devops
info: Adding user `devops' ...
info: Selecting UID/GID from range 1000 to 59999 ...
info: Adding new group `devops' (1001) ...
info: Adding new user `devops' (1001) with group `devops (1001)' ...
info: Creating home directory `/home/devops' ...
info: Copying files from `/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for devops
Enter the new value, or press ENTER for the default
        Full Name []:
        Room Number []:
        Work Phone []:
        Home Phone []:
        Other []:
Is the information correct? [Y/n]
info: Adding new user `devops' to supplemental / extra groups `users' ...
info: Adding user `devops' to group `users' ...
root@ip-172-31-39-232:/home/ubuntu#
root@ip-172-31-39-232:/home/ubuntu#
root@ip-172-31-39-232:/home/ubuntu#
```

**i-03f464371ff4c5926 (Ansible-node)**

PublicIPs: 34.207.241.222 PrivateIPs: 172.31.39.232

g)Master – making changes in sshd_config file

```
root@ip-172-31-34-156:/home/ubuntu# vi /etc/ssh/sshd_config
```

```
#LoginGraceTime 2m
PermitRootLogin yes
#StrictModes yes
#MaxAuthTries 6
#MaxSessions 10

PubkeyAuthentication yes

# Expect .ssh/authorized_keys2 to be disregarded by default in future.
#AuthorizedKeysFile     .ssh/authorized_keys .ssh/authorized_keys2

#AuthorizedPrincipalsFile none

#AuthorizedKeysCommand none
#AuthorizedKeysCommandUser nobody

# For this to work you will also need host keys in /etc/ssh/ssh_known_hosts
#HostbasedAuthentication no
# Change to yes if you don't trust ~/.ssh/known_hosts for
# HostbasedAuthentication
#IgnoreUserKnownHosts no
# Don't read the user's ~/.rhosts and ~/.shosts files
#IgnoreRhosts yes

# To disable tunneled clear text passwords, change to no here!
PasswordAuthentication yes
#PermitEmptyPasswords no
-- INSERT --
```

**i-0d40b6e056e27dac2 (Ansible-master)**

PublicIPs: 13.223.179.221 PrivateIPs: 172.31.34.156

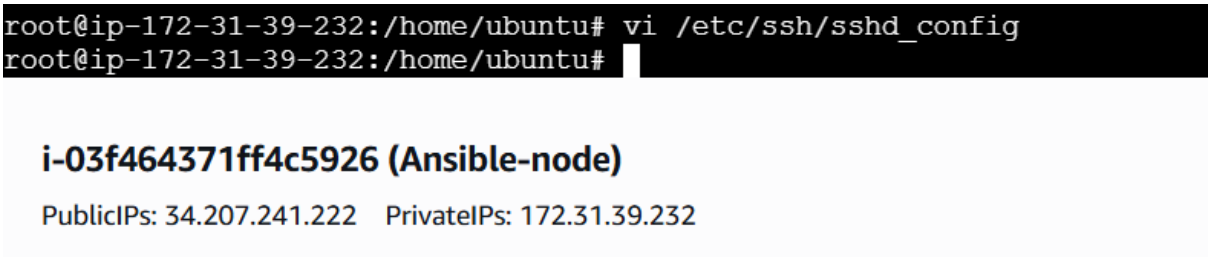
h) Master– making changes in 60-cloudimg-settings.conf file

```
root@ip-172-31-34-156:/home/ubuntu# vi /etc/ssh/sshd_config.d/60-cloudimg-settings.conf
```

**i-0d40b6e056e27dac2 (Ansible-master)**

PublicIPs: 13.223.179.221 PrivateIPs: 172.31.34.156


i) Node – making changes in sshd_config file



```
#LoginGraceTime 2m
PermitRootLogin yes
#StrictModes yes
#MaxAuthTries 6
#MaxSessions 10

PubkeyAuthentication yes

# Expect .ssh/authorized_keys2 to be disregarded by default in future.
#AuthorizedKeysFile     .ssh/authorized_keys .ssh/authorized_keys2

#AuthorizedPrincipalsFile none

#AuthorizedKeysCommand none
#AuthorizedKeysCommandUser nobody

# For this to work you will also need host keys in /etc/ssh/ssh_known_hosts
#HostbasedAuthentication no
# Change to yes if you don't trust ~/.ssh/known_hosts for
# HostbasedAuthentication
#IgnoreUserKnownHosts no
# Don't read the user's ~/.rhosts and ~/.shosts files
#IgnoreRhosts yes

# To disable tunneled clear text passwords, change to no here!
PasswordAuthentication yes
#PermitEmptyPasswords no

-- INSERT --
```

**i-03f464371ff4c5926 (Ansible-node)**

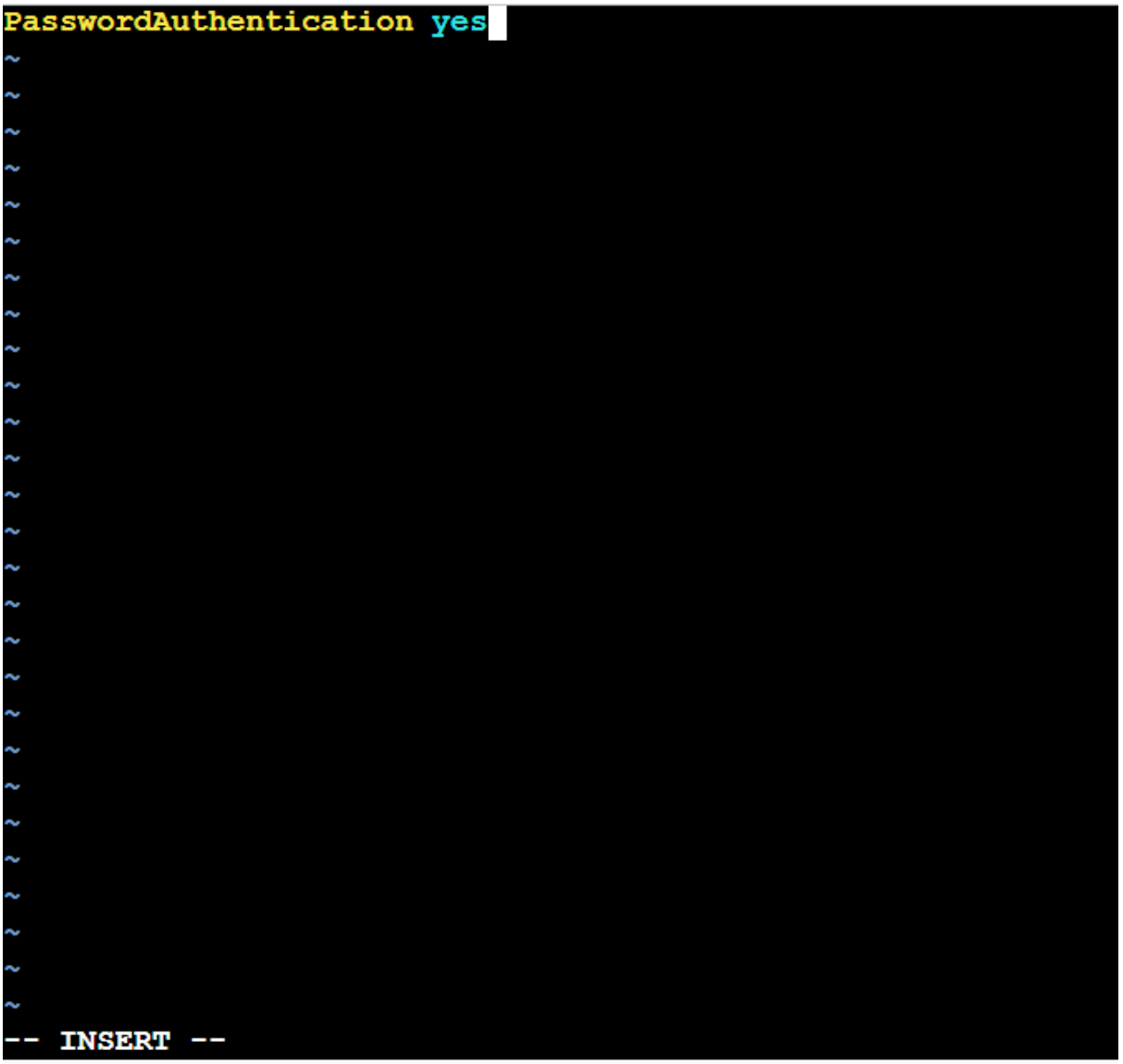
PublicIPs: 34.207.241.222 PrivateIPs: 172.31.39.232

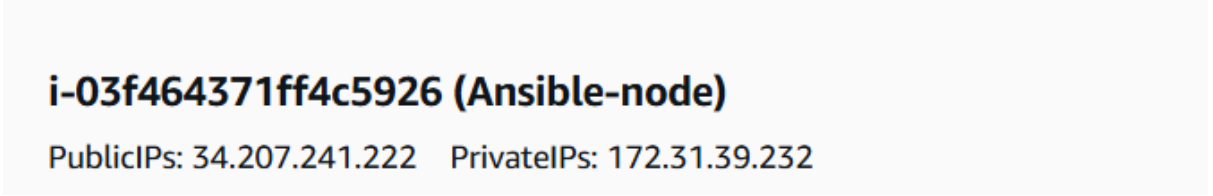
j)Node – making changes in 60-cloudimg-settings.conf file

```
root@ip-172-31-39-232:/home/ubuntu# vi /etc/ssh/sshd_config.d/60-cloudimg-settings.conf
root@ip-172-31-39-232:/home/ubuntu#
```

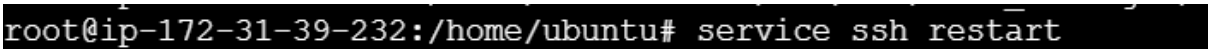
**i-03f464371ff4c5926 (Ansible-node)**

PublicIPs: 34.207.241.222 PrivateIPs: 172.31.39.232




k)Restarting both node and master




**Step 3. Giving sudo all permissions in master**

a) Master opening visudo

```
root@ip-172-31-34-156:/home/ubuntu# visudo
root@ip-172-31-34-156:/home/ubuntu#
```

**i-0d40b6e056e27dac2 (Ansible-master)**

PublicIPs: 13.223.179.221 PrivateIPs: 172.31.34.156

```
  GNU nano 7.2
# "sudo scp" or "sudo rsync" should be able to use your SSH agent.
#Defaults:%sudo env_keep += "SSH_AGENT_PID SSH_AUTH_SOCK"

# Ditto for GPG agent
#Defaults:%sudo env_keep += "GPG_AGENT_INFO"

# Host alias specification

# User alias specification

# Cmnd alias specification

# User privilege specification
root    ALL=(ALL:ALL) ALL
devops  ALL=(ALL:ALL) NOPASSWD :ALL
# Members of the admin group may gain root privileges
%admin ALL=(ALL) ALL

# Allow members of group sudo to execute any command
%sudo   ALL=(ALL:ALL) ALL

# See sudoers(5) for more information on "@include" directives:

@includedir /etc/sudoers.d

^G Help          ^O Write Out     ^W Where Is      ^K Cut           ^T Execut
^X Exit          ^R Read File     ^\ Replace       ^U Paste         ^J Justif
```

**i-0d40b6e056e27dac2 (Ansible-master)**

PublicIPs: 13.223.179.221 PrivateIPs: 172.31.34.156

**Step 4. Entering in devops and generating key**

a) Master - Generating key

```
root@ip-172-31-34-156:/home/ubuntu# su - devops
devops@ip-172-31-34-156:~$ sudo-keypair
sudo-keypair: command not found
devops@ip-172-31-34-156:~$ ssh-keygen
Generating public/private ed25519 key pair.
Enter file in which to save the key (/home/devops/.ssh/id_ed25519):
Created directory '/home/devops/.ssh'.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/devops/.ssh/id_ed25519
Your public key has been saved in /home/devops/.ssh/id_ed25519.pub
The key fingerprint is:
SHA256:lBG3Bq8JotOiXXB6VnLp72qJ0XJUjfErloT5zTernvY devops@ip-172-31-34-156
The key's randomart image is:
+--[ED25519 256]--+
|        ==.      |
|       +oB..     |
|   . + B.+ =     |
|    * *.= B .    |
|   = =o. S + o   |
| o *o oo . . o   |
|. .  = ..   .    |
|    . o.  .o     |
|     ....o+.E    |
+----[SHA256]-----+
devops@ip-172-31-34-156:~$
```

**i-0d40b6e056e27dac2 (Ansible-master)**

PublicIPs: 13.223.179.221 PrivateIPs: 172.31.34.156

b) Master – copying keypair and establishing connection between nodes and master

```
devops@ip-172-31-34-156:~$ ls
devops@ip-172-31-34-156:~$ ls -a
.  ..  .bash_logout  .bashrc  .profile  .ssh
devops@ip-172-31-34-156:~$ d .ssh
d: command not found
devops@ip-172-31-34-156:~$ cd .ssh
devops@ip-172-31-34-156:~/.ssh$ ssh-copy-id devops@172.31.39.232
```

**i-0d40b6e056e27dac2 (Ansible-master)**

PublicIPs: 13.223.179.221 PrivateIPs: 172.31.34.156

## Step 5. Generating files in all nodes through master and cross checking it

a) Master – creating files

```
devops@ip-172-31-34-156:~/.ssh$ ansible all -a"touch file1.sh"
[WARNING]: Platform linux on host 172.31.39.232 is using the discovered Python interpreter at /usr/bin/python3.12, but future installation of another Python
interpreter could change the meaning of that path. See https://docs.ansible.com/ansible-core/2.18/reference_appendices/interpreter_discovery.html for more
information.
172.31.39.232 | CHANGED | rc=0 >>

devops@ip-172-31-34-156:~/.ssh$
```

**i-0d40b6e056e27dac2 (Ansible-master)**

PublicIPs: 13.223.179.221 PrivateIPs: 172.31.34.156

b) Master - checking files in master

```
devops@ip-172-31-34-156:~/.ssh$ ansible all -a"ls"
[WARNING]: Platform linux on host 172.31.39.232 is using the d
interpreter could change the meaning of that path. See https:/
information.
172.31.39.232 | CHANGED | rc=0 >>
file1.sh
file2.sh
devops@ip-172-31-34-156:~/.ssh$
```

**i-0d40b6e056e27dac2 (Ansible-master)**

PublicIPs: 13.223.179.221 PrivateIPs: 172.31.34.156

c) Node – checking the created file in node

```
root@ip-172-31-39-232:/home/ubuntu# cd ..
root@ip-172-31-39-232:/home# ls
devops  ubuntu
root@ip-172-31-39-232:/home# cd devops
root@ip-172-31-39-232:/home/devops# ls
file1.sh  file2.sh
root@ip-172-31-39-232:/home/devops#
```

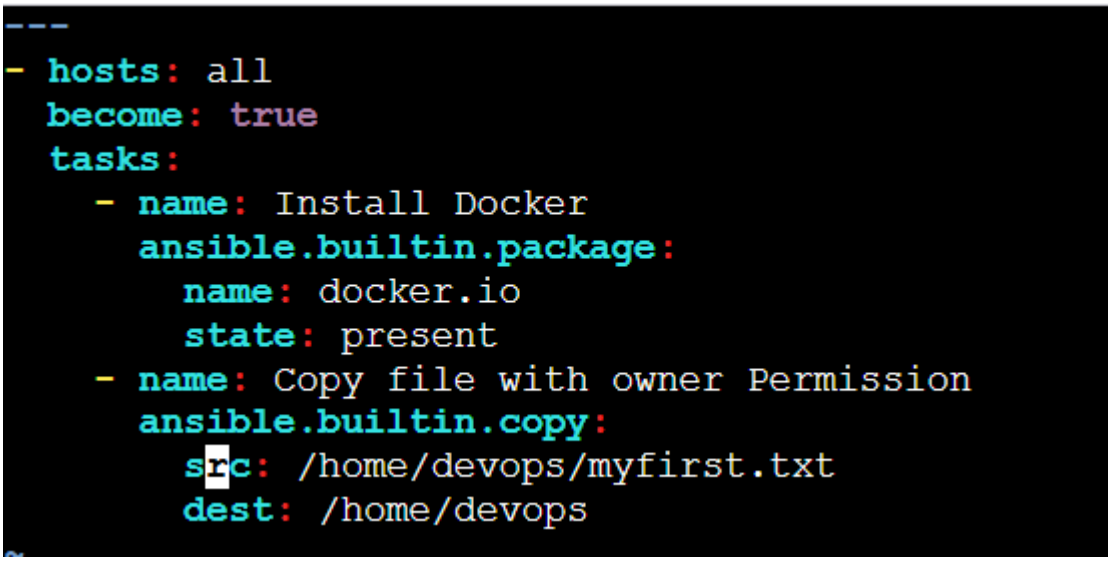
**i-03f464371ff4c5926 (Ansible-node)**

PublicIPs: 34.207.241.222 PrivateIPs: 172.31.39.232

## Question 2 - Practice writing ansible playbook

a) Creating the yaml file / Playbook to install Docker and copy a file

```
devops@ip-172-31-38-71:~$ vi myfirstplaybook.yml
```



```
---
- hosts: all
  become: true
  tasks:
    - name: Install Docker
      ansible.builtin.package:
        name: docker.io
        state: present
    - name: Copy file with owner Permission
      ansible.builtin.copy:
        src: /home/devops/myfirst.txt
        dest: /home/devops
```

## Question 3 - Write ansible playbook to install tomcat 9 in node

a) Write a YAML file to install apache